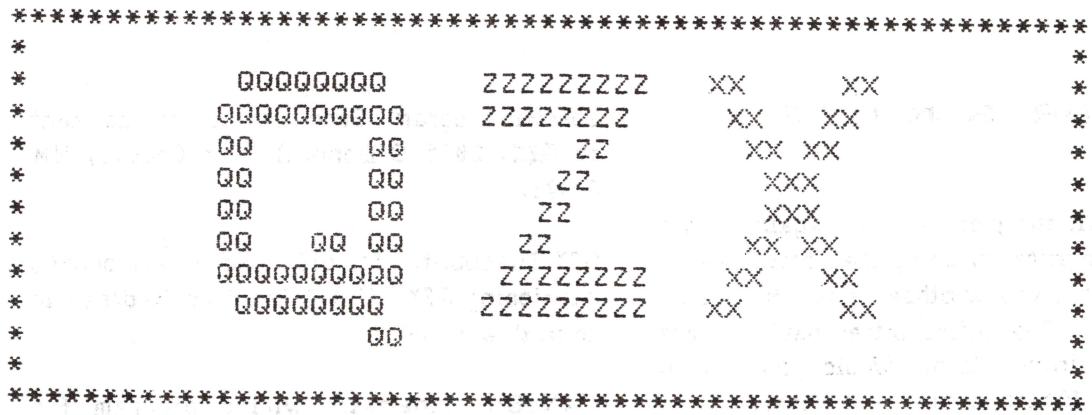
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The Journal Covering Amateur Radio & Sinclair Computers
ZX80; Micro-Ace; ZX81; TS1000, 1500, & 2068; QL; Z88

Alex. F. Burr, K5XY, Publisher
2025 O'Donnell Drive
Las Cruces, New Mexico
88001

Volume 8 Number 6 ($1.50 / issue) 1990 May

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## EDITOR'S NOTES

K5XY

Well, the printer did it again. I got yet another price for doing the April issue.

I received another letter from Iran this month. The entire letter said "I want some more information. Would you please, guide me." It had no signature either.

Another Sinclair newsletter is ceasing to publish. The SINCUS news published by the Sinclair Computer Users Society of Johnson City, NY will stop publishing in July. The club itself is headed in the MSDOS direction.

Not all written material is disappearing however. S.N.U.G., the national Sinclair organization which has been trying to start for the last year, is making more noises about sponsoring a national newsletter. The Computer Shopper which was a national source of Sinclair information dropped their Sinclair column when it was sold. However a new magazine has started up which is very similar to the Computer Shopper called Computer Buyer's Guide. It has many of the same type of advertisements and is reported to be planning a Sinclair column. It does have one Sinclair classified ad in the May issue. It will be on the newsstands.

Well, QZX is late again. It seems I cannot stand prosperity. I have no excuse this time. I just procrastinated too long.

## UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZK, 2025 O'Donnell, Las Cruces, NM 88001.

QZX Discount: 15% discount on all orders mentioning QZX. T & C Services (address in ad in this issue).

WANTED: Schematic wiring diagram for "Banana Gorrilla" printer. Edward L. Radtke, 1602 Woodliuck Ave., Louisville, Kentucky 40205, 502-458-7324.

## QZX FRIENDS

WB9AIN -- Renewed because of the article in the March issue by LU8MAD. He just bought a new TS1500.

WA4BQE -- Ed wrote that his son from Las Cruces is coming to Louisville and they are both going to the Dayton Hamfest on a 17 hour shopping spree along with 22,000 other people. I wish I could go with them. I bet they find lots of Sinclair stuff.

SM7HBQ -- A rather late note about Hans relayed by WA6DLI. Most of you will not have heard of Hans but he was at one time the European distributor of QZX. Bob says that Hans has built up a large mail order business from his small Sinclair beginning. He now carries IBM clones and other computers.

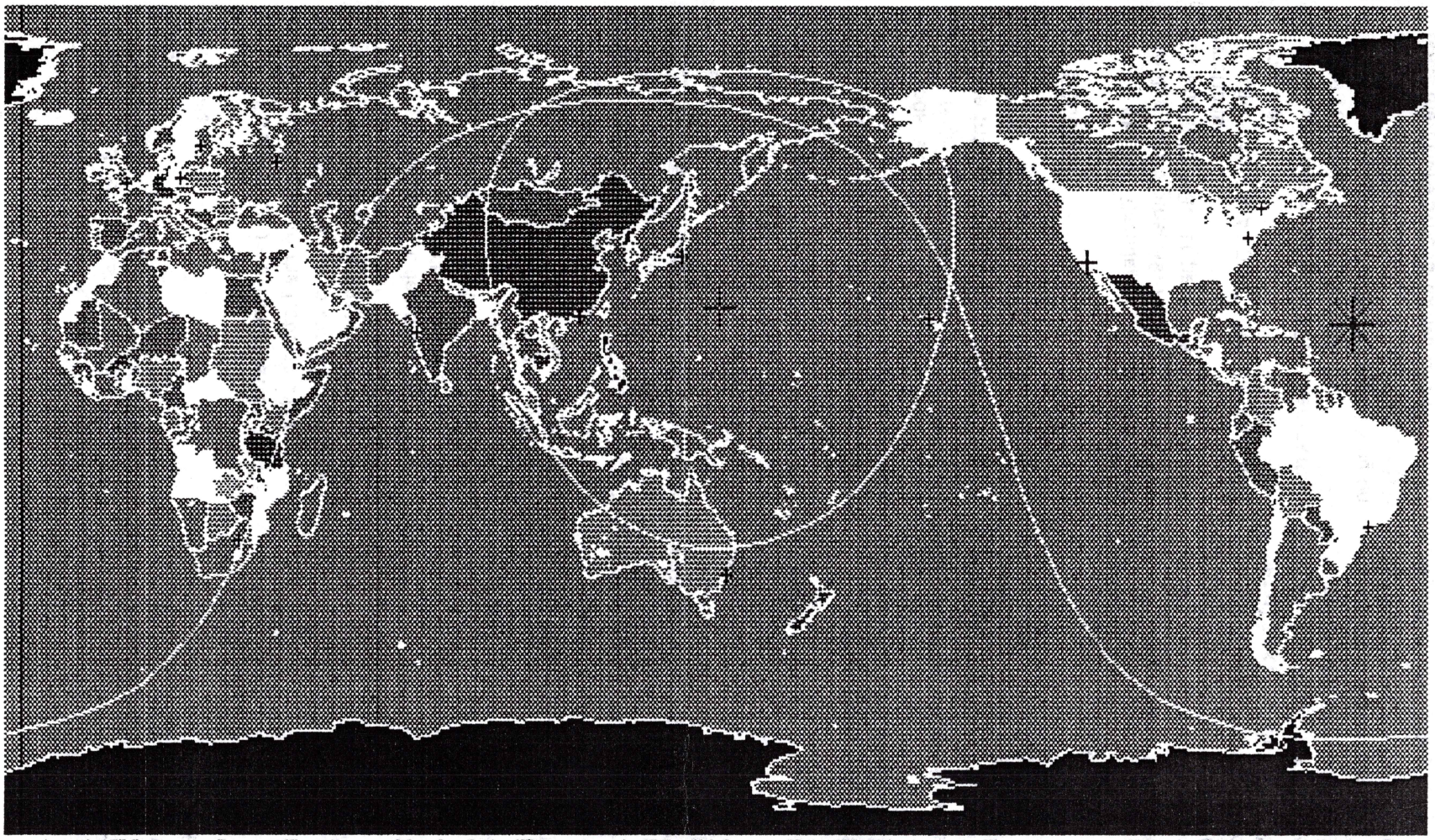
## SATELLITE MAP

WA6DLI

The picture on the next page is a satellite map sent in by WA6DLI as an example of the type of information which can be displayed with some of the current programs. This picture is from a program by N4HY.

QZX 1990 MAY

AO-10 WA6DLI AOS: 00:11:34 Thu Jul 20 15:28:21 1989



| Az/ El | Lng/Lat | Height/Range/ | Ph/Md | PA/E/V | Dop. | ES | SSE | Orbit |
|---|---|---|---|---|---|---|---|---|
| 292/-23 | 210/ 24 | 3955/11031/ | 1/0 | 83/0/ | 0Hz | 38 | 49 | 4591 |

# EXPLORING THE TS1000 SINCLAIR LOGIC CHIP (SCL) VII

Don Lamen

This article is a continuation of the series which began in the October 1989 issue of QZX. The purpose is to explain the function of the SCL logic chip in the ZX and TS1000 series of Sinclair computers. This chip is a custom chip designed particularly for our computers. The previous articles gave some background on the chip, provided a functional diagram, and listed 17 separate functions performed by the chip. These and succeeding articles discuss these functions individually and provide an equivalent circuit diagram for the function. These circuit diagrams are only the equivalent of the actual circuits inside the chip because nothing is known about the real connections inside, but the circuits given here will perform the function of the real circuit. For a list of these 17 functions see the October issue of QZX.

Last month we looked at some of the smaller circiuts in the SCL. This month we will look at one of the more complicated ones. It is particularly important for those who are interested in adding memory to their computer.

## I/O DECODER

The I/O Decoder is very primitive. It samples only 5 pins; A0, A1, NOT, IORQ, NOT RD, and NOT WR. It performs the following functions:

1. When A0 = 0 AND NOT RD = 0 AND NOF IORQ = 0
   a) It turns on the Frame Sync Generator
   b) It enables Input Port FE
   c) As a result of the Frame Sync being on it holds the Scan Counter in the Reset state until the Frame Sync is turned OFF.
2. When NOT IORQ = 0 AND NOT WR = 0 any output will
   a) Turn the Frame Sync Generator OFF and release the Scan Line Counter.
   b) Flash the TV screen.
3. When A0 = 0 AND NOT WR = 0 AND NOT IORQ 0 the SCL ON-OFF flip-flop will be set, enabling the Non-Maskable Interrupt Circuit.
4. When A1 = 0 AND NOT WR = 0 AND NOT IORQ = 0, the SCL ON-OFF flip-flop will be reset, disabling the Non-Maskable Interrupt Circuit.

A possible diagram for this circuit is shown on the next page.

## N0N-MASKABLE INTERRUPT GENERATOR

The Non-Maskable Interrupt Generator consists of the SCL ON-OFF flip-flop and a 2 input NAND gate. When the SCL ON-OFF flip-flop is set, the NAND gate is enabled allowing the Horizontal Sync signal to pass to pin 15 (NOT NMI). This circuit is on the next page.

## WAIT CIRCUIT

This circuit is outside the SCL chip on the PC board and is built around transistor TR-1. When the NOT NMI signal is low and the NOT HALT signal is high, this circuit will pull the NOT WAIT pin of the Z-80 low, generating wait states until the Horizontal Sync signal goes low.

## FRAME SYNC GENERATOR

The Frame Sync Generator is a set-reset flip-flop. Its Q output generates a signal for the Vertical Sync Pulse and goes to the Video Combiner Circuit. (Discussed in detail next month.) The NOT Q output supplies the reset for the Scan Line Counter. Some of the details of these circuits are given on the next page. All these circuits can be located in the upper right area of the figure in the October 1989 issue of QZX.

Next month we will look at the video circuits.

# I/O DECODING, FRAME SYNC AND NMI

4-19-88

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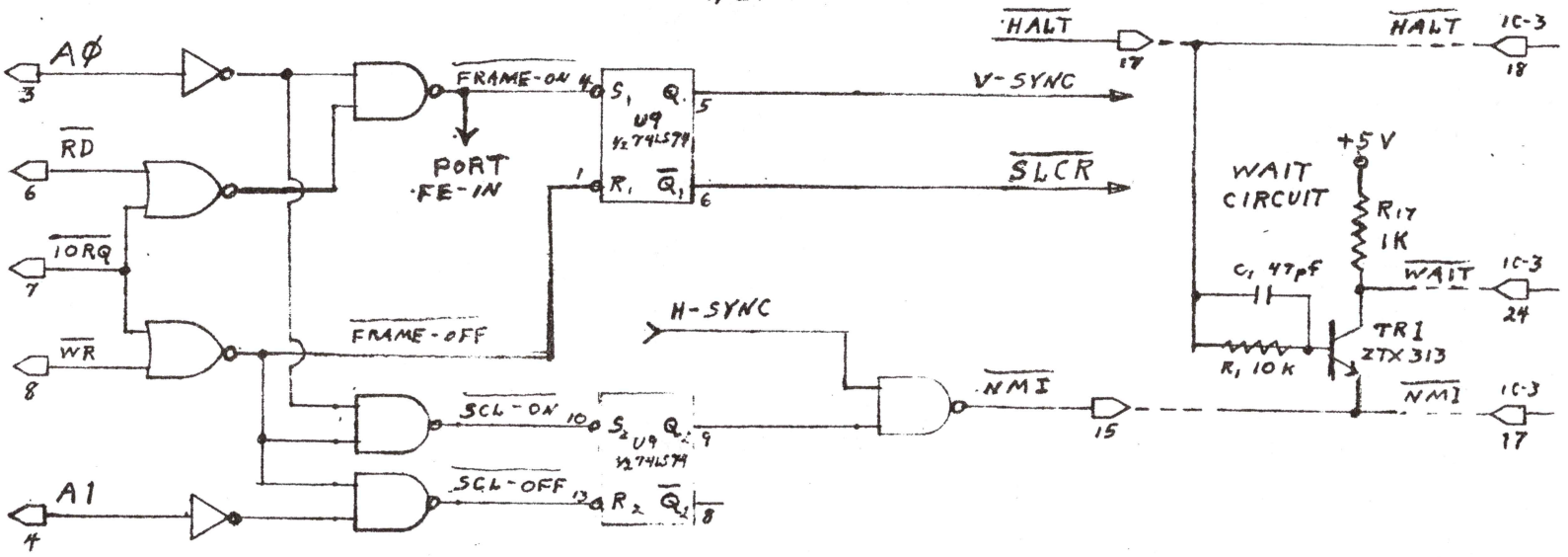
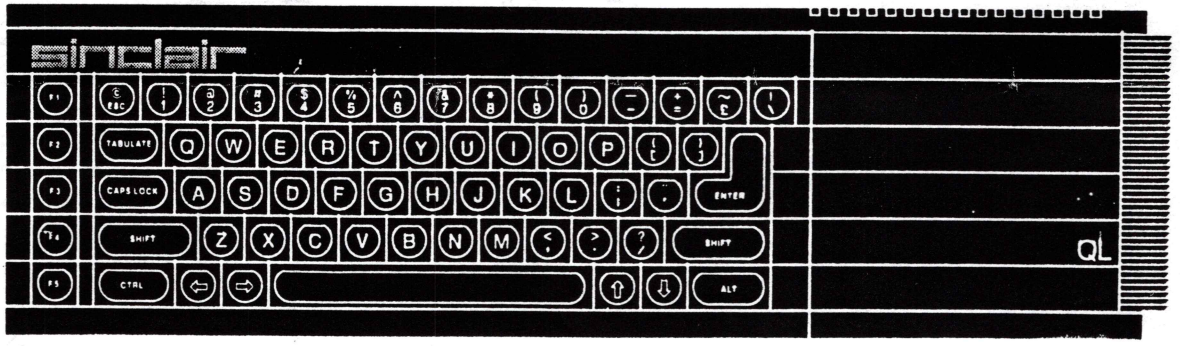


# QL MONITOR SIGNALS

I. S. T. U. G.

The following information is adapted from the Indiana Sinclair-Timex Newsletter published by I.S.T.U.G. It gives some information about the monitor signals put out by the QL. The polarity of the monitor sync signals are the opposite of that required by many monitors.

Different monitors use different types of sync signals. Usually monitors which ask for horizontal sync signals will accept composite sync signals as well. If this is true of your monitor, you may be able to use it with the QL. The QL provides a vertical sync signal and a composite signal. Sometimes one or both of these signals from the QL must be inverted. The US QL's also provide +5 VDC on the monitor connector. Thus it is easy to use a TTL integrated circuit to invert these signals if necessary. The most convenient IC to use is a 74LS04, but many other chips can be used if the pin-outs are changed. On the next page, is a three part figure. The top part shows the connections for a 74LS04 used to invert both sync signals. The middle part gives information about the signals available at the monitor connector of the QL, and the bottom part gives the pin designations of the monitor output connector on the QL.

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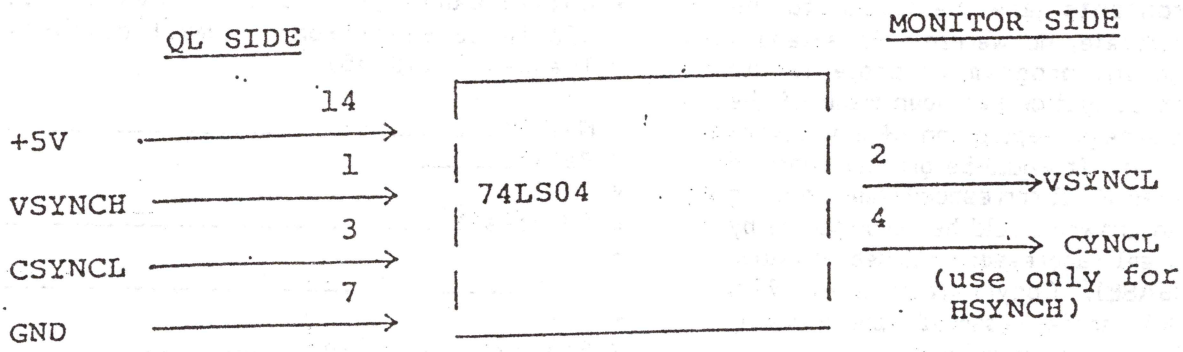
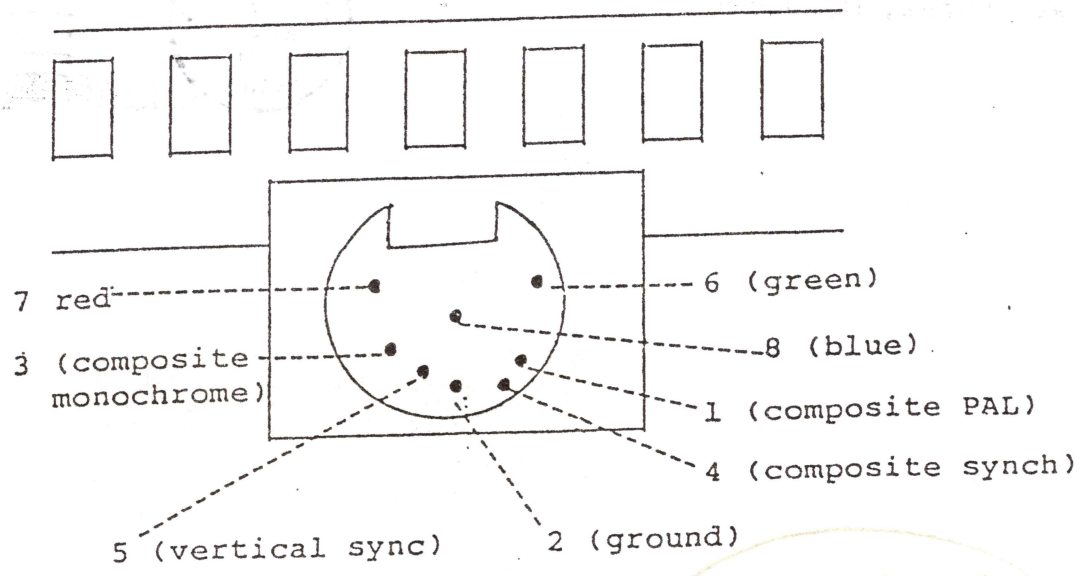



| Pin | Function | Signal | Wire Color | Signal Level |
|---|---|---|---|---|
| 1 | PAL | composite PAL | orange | 1V pk-pk into 75 ohms |
| 2 | GND | ground | green | |
| 3 | VIDE | composite monochrome video | brown | 1V pk-pk into 75 ohms |
| 4 | CSYN | composite sync | yellow | 0-5V TTL (active low) |
| 5 | VSYN | vertical sync | blue | 0-5V TTL (active high) |
| 6 | GREE | green | red | 0-5V TTL (active high) |
| 7 | RED | red | white | 0-5V TTL (active high) |
| 8 | BLUE | blue | purple | 0-5V TTL (active high) |

Diagram of Monitor Connector as Viewed from rear of QL. Showing pin number and functions:



73, K5XY

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